MERCURY
CONTAINER TRADING

TECHNICAL SPECIFICATION

FOR

STEEL DRY CARGO CONTAINER

40' x 8' x 9'6" ISO 1AAA TYPE

MODEL NO : **RXTY-40AB-1AX**

SPEC. NO : **RXTY-40AB-1AX-S**

DATE OF ISSUE : **May 9, 2021**

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1. General

1.1 Scope

This specification will cover the design, construction, materials, testing and inspection performances of 40' x 8' x 9'6" ISO 1AAA type steel dry cargo containers.

These containers specified herein will be manufactured at . under strict quality control by RXTC and be approved by the classification society or agency.

1.2 Operational environment

The container will be designed and constructed for carriage of general cargo by marine (on or below deck), road and rail throughout the world. All materials used in the construction will be to withstand extremes of temperature range from -40°C (-40°F) to +70°C (+158°F) without effect on the strength of the basic structure and watertightness.

1.3 Standards and Regulations

The container will satisfy the following requirements and regulations, unless otherwise mentioned in this specification.

1.3.1 ISO Container Standards (1AAA type)

ISO 668 - Series 1 freight containers - Classification external dimensions and ratings

ISO 830 - Terminology in relation to freight container

ISO 1161 - Series 1 freight containers - Corner fittings Specification

ISO 1496-1 - Series 1 freight containers - Specification and testing.
Part 1: General cargo containers for general purposes

ISO 6346 - Freight containers - coding, identification and marking

1.3.2 T.I.R. Certification

All the containers will be certified and comply with "The Customs Convention on the International Transport of Goods under the cover of T.I.R. Carnets." or "The Customs Convention on Containers."

1.3.3 C.S.C. Certification

All the containers will be certified and comply with the requirements of the "International Convention for the Safe Containers."

1.3.4 T.C.T. Certification

All exposed wooden components used for container will be treated to comply with the requirements of "Cargo Containers - Quarantine Aspects and Procedures" of the Commonwealth Department of Health, Australia.

1.3.5 U.I.C. Registration

All the containers will be registered and comply with the "International Union of Railways."

1.3.6 *Classification society*

All the containers will be certified for design type and individually inspected by classification society, BV, ABS, LR or CCS.

1.4 *Handling*

The container will be constructed to be capable of being handled without any permanent deformation under the following conditions:

a) Lifting, full or empty, at top corner fittings vertically by means of spreaders fitted with hooks, shackles or twistlocks.

b) Lifting, full or empty, at bottom corner fittings using slings with terminal fittings at any angles between vertical and 30 degrees to the horizontal.

1.5 *Transportation*

The container will be constructed to be suitable for transportation in the following modes:

a) Marine : In the ship cell guides of vessels, nine (9) high stacked.
On the deck of vessels, four (4) high stacked and secured by vertical and diagonal wire lashings.

b) Road : On flat bed or skeletal chassis, secured by twistlocks or equivalent at the bottom corner fittings.

c) Rail : On flat cars or special container cars secured by twistlocks or equivalent at the bottom corner fittings.

2. ***Dimensions and Ratings***

2.1 *External Dimensions*

Length	12,192	+ 0 mm - 10mm	40'0"	+0 -3/8"
Width	2,438	+ 0mm - 5mm	8'	+0 -3/16"
Height	2,896	+ 0mm - 5mm	9'6"	+0 -3/16"

1) No part of the container will protrude beyond the external dimensions mentioned above.
2) Maximum allowable differences between two diagonals on anyone of the following surfaces will be as follows:

Roof, bottom and side diagonals	:	19mm	3/4"
Front and rear diagonals	:	10mm	3/8"

2.2 *Internal Dimensions*

Length	12,032	+ 0 mm - 10mm	39' 5 45/64"	+0 -3/8"
Width	2,350	+ 0mm - 5mm	7' 8 33/64"	+0 -3/16"
Height	2,698	+ 0mm - 5mm	8'10 7/32"	+0 -3/16"

2.3 *Door opening dimensions*

Width	2,340	+ 0mm - 5mm	7' 8 1/8"	+0 -3/16"
Height	2,585	+ 0mm - 5mm	8' 5 49/64"	+0 -3/16"

2.4 *Internal cubic capacity (Nominal)*

76.3 cu.m	2,694 cu.ft

2.5 *Gooseneck tunnel*

Length	3,315mm		10' 10 1/2"	
Width	1,029 + 3 mm - 0 mm		3' 4 1/2"	+1/8" -0
Height	120 + 0 mm - 3 mm		4 23/32"	+0 -1/8"

2.6 *Ratings*

Max. Gross Weight (R)	30,480 kgs	67,200 lbs
Tare Weight (design) (T)	3,480 kgs	7,670 lbs
Max. Payload (P)	27,000 kgs	59,530 lbs

Tare Weight Tolerance **2%**

3. *Materials*

3.1 *General*

The following materials will be used in the construction of containers.

3.2 *Part specification*

	Parts	***Materials by JIS***
1)	All steel except screws, rivets, bolts/nuts, door hardwares and other shown on drawings and specification	Anti-Corrosive Steel: CORTEN A, SPA-H, B480 or equivalent Y.P. : 35 kg/sq. mm T.S. : 49 kg/sq. mm
2)	Rear corner posts (inner)	Rolled high tensile steel: SM490A or equivalent Y.P. : 33 kg/sq. mm T.S. : 50 kg/sq. mm
3)	Door locking bars	Structural steel round pipe: STK41 Y.P. : 24 kg/sq. mm T.S. : 41 kg/sq. mm
4)	Corner Fitting	Casted weldable steel: SCW480 Y.P. : 28 kg/sq. mm T.S. : 49 kg/sq. mm
5)	Locking gear cams and keepers	Forged weldable steel: S20C Y.P. : 23 kg/sq. mm T.S. : 44 kg/sq. mm
6)	Door hinge pins Door gasket retainer	Stainless steel
7)	Door gasket	EPDM
8)	Floor board	BAMBOO
9)	Ventilator	ABS resin labyrinth type

* Note: Y.P. --- Yielding Point
T.S. --- Tensile Strength

4. Construction

4.1 General

4.1.1 The container will be constructed with steel frames, fully vertical-corrugated steel sides and front wall, horizontal-corrugated steel double doors at rear end, die-stamped steel roof and corner fittings.

4.1.2 All welds of exterior including the base frames will be continuous welding using CO_2 gas, but inner part of each bottom side rail will be fastened by staggered stitch welding.

4.1.3 Interior welds - when needed - will be stitched with a minimum length of 15mm.

4.1.4 Gaps between adjacent components to be welded will not exceed 3mm or the thickness of the parts being welded.

4.1.5 Chloroprene sealant is to be applied at periphery of floor surface and inside unwedded seams, butyl sealant is used to caulk at invisible seam of floor joint area and between door gasket and frame.

4.1.6 The bamboo floor will be fixed to the base frames by zinc plated self-tapping screws.

4.2 Protrusion

4.2.1 The plane formed by the lower faces of the bottom side rails and all transverse members shall be positioned by 12.5mm +5/-1.5mm above the plane formed by the lower faces of the bottom corner fittings.

4.2.2 The top corner fittings are to protrude a minimum of 6mm above the highest point of the roof.

4.2.3 The outside faces of the corner fittings will protrude from the outside faces of the corner posts by nominal 3 mm for the front and nominal 4 mm for the rear.

4.2.4 The outside faces of the corner fittings will protrude from the outside faces of the sides and front wall by nominal 8 mm.

4.2.5 Under maximum payload, no part of the container will protrude below the plane formed by the lower faces of the bottom corner fittings at the time of maximum deflection.

4.2.6 Under 1.8 x maximum gross weight, no part of the container will protrude more than 6.0mm below the plane formed by the lower faces of the bottom corner fittings at the time of maximum deflection.

4.3 Corner fittings

The corner fittings will be designed in accordance with ISO 1161 and manufactured at the works approved by classification society.

4.4 Base frame structure

Base frame will be composed of two (2) bottom side rails, twenty-eight (28) cross members, and a gooseneck tunnel.

4.4.1 *Bottom side rail*

Each bottom side rail is built of 52x30x155x28x4.5mm thick cold-formed channel section steel made in one piece.
The lower flange of the bottom side rail is outward so as to facilitate easy removal of the cross members during repair and of less susceptible corrosion.
Reinforcement plates are to be made of 4.0mm thick, flat steel plates. The plates are welded to bottom corner fitting.

4.4.2 *Cross member*

The cross members are made of pressed channel section steel with a dimension of 45x122x45x4.0mm for the normal areas and 75x122x45x4.0mm for the floor butt joints. The large one is reinforced by three 4.0 mm thick gussets. The cross members are placed fully to withstand floor strength and welded to each bottom side rail.

4.4.3 *Gooseneck tunnel*

The gooseneck tunnel consists of 4.0mm thick pressed hat section steel plate, twelve 4.5mm thick pressed channel section bows which are welded to the top plate, one 4.0mm thick enclosed section tunnel rear bolster which is separated into two "C" section parts, and sixteen 4.0mm thick tunnel outriggers.
The gooseneck tunnel is designed in accordance with ISO requirements.

4.5 *Flooring*

The floor will consist of twelve pieces plywood boards, floor centre rail, and self-tapping screws.

4.5.1 *Floor*

The bamboo floor to be constructed with 28mm thick 21-ply hardwood plywood boards are laid longitudinally on the transverse members between the steel floor centre rail of 4.0mm thick flat bar .
The floorboards are tightly secured to each transverse member by self-tapping screws, and all butt joint areas and peripheries of the floorboards are caulked with sealant.

1) Wood species : BAMBOO
2) Glue : Phenol-formaldehyde resin.
3) Treatment :
   a) Preservative: MEGANIUM 2000 or others
      in accordance with Australian Health Department Regulations.
   b) Average moisture content will be 12% before installation.

4.5.2 *Self-tapping screw*

Each floor board is fixed to the transverse members by zinc plated self-tapping screws that are 8.0mm dia. shank x 16mm dia. head x 45mm length, and fastened by four screws per cross member but five screws at joint areas. Screw heads are to be countersunk through about 2mm below the floor top surface.

4.6 *Rear frame structure*

The rear frame will be composed of one door sill, two corner posts, one door header and four corner fittings, which will be welded together to make the door-way.

4.6.1 *Door sill*

The door sill to be made of a 4.5 mm thick pressed open section steel is reinforced by four internal gussets at the back of each locking cam keeper location.
There is cut out at each end of the door sill and reinforced by a 200x75x9.0 mm channel steel as a protection against handling equipment damages.
The upper face of the door sill has a 10 mm slope for better drainage.

4.6.2 *Rear corner post*

Each rear corner post of hollow section is fabricated with pressed, 6.0mm thick, steel outer part and 40x113x12mm hot-rolled channel section steel inner part, which are welded continuously together to ensure a maximum width of the door opening and to give a sufficient strength against stacking and racking forces.
Four (4) sets of hinge pin lugs are welded to each rear corner post.

4.6.3 *Door header*

The door header is constructed with a 4.0mm thick pressed "U" section steel lower part having four internal gussets at the back of each locking cam keeper location and a 3.0mm thick pressed steel upper part, which are formed into box section by continuous welding.

4.7 *Door*

4.7.1 Each container will have double wing doors at rear end frame, and each door will be capable of swinging approximately 270 degrees.

4.7.2 Each door is constructed with pressed, 3.0mm thick, channel section steel horizontal frames for the top and bottom, 100x50x3.2 mm thick rectangular hollow section vertical frames for the post side and centre side of door respectively, 2.0mm thick horizontally corrugated steel door panel, which are continuously welded within frames.

4.7.3 Two sets of galvanized "SJ-66M" bolt on model locking assemblies with forged steel handles are fitted to each door using zinc plated steel bolts and Huck bolts according to TIR requirements. Locking bar retainers are fitted with nylon bushings at the top, bottom and intermediate bracket.
Locking gears should be assembled after painting of container.
The shims are to be provided between locking brackets and door panel.

4.7.4 The left-hand door can not be opened without opening the right-hand door when the container is sealed in accordance with TIR requirements.

4.7.5 The door hold-back of nylon rope is provided to the centre locking bar on each door and a hook of steel bar is welded to each bottom side rail.

4.7.6 Each door is suspended by four hinges provided with stainless steel pins, self-lubricating nylon bushings and stainless steel washers, which are placed at the hinge lugs of the rear corner posts.

4.7.7 The door gasket made of an extruded triple lip type (J-C type - vertical and upper are "J", lower is "C") EPDM rubber with a corner lip at right door left top corner for better waterproof is installed to the door peripheral frames with stainless steel gasket retainers and fastened by

stainless steel rivets at a pitch of 150mm. The door gasket must be caulked with butyl sealant before installation to the door frames.

4.8 *Roof structure*

The roof will be constructed with eleven five-corrugated (die-stamped) steel panels and four corner protection plates.

4.8.1 *Roof panel*

The roof panel is constructed with 2.0mm thick die-stamped steel sheets having about 6.0mm upward smooth camber, which are welded together to form one panel and continuously welded to the top side rails and top end rails. All overlapped joints of inside unwedded seams are caulked with chloroprene sealant.

4.8.2 *Protection plate*

Each corner of the roof in the vicinity of top corner fitting is reinforced by 3.0mm thick rectangular steel plate to prevent the damage caused by mishandling of lifting equipment.

4.9 *Top side rail*

Each top side rail is made of a 60x60x3.0mm thick square hollow section steel.

4.10 *Side wall*

The trapezium section side wall is constructed with 1.6mm thick fully vertically continuous-corrugated steel panels at the intermediate area and 2.0mm thick fully vertically continuous-corrugated steel panels at both ends which are butt welded together to form one panel and continuously welded to the side rails and corner posts. All overlapped joints of inside are caulked with chloroprene sealant.

4.11 *Front structure*

Front end structure will be composed of one bottom end rail, two corner posts, one top end rail, four corner fittings and an end wall, which are welded together.

4.11.1 *Bottom end rail*

The bottom end rail to be made of two 8.0 mm thick steel lower part, 60x60x3.0 mm thick full width square hollow section upper part and two 3.0 mm thick flat steel plates for floor board support.
There is two 8.0mm thick steel as a protection against handling equipment damages.

4.11.2 *Front corner post*

Each corner post is made of 6.0mm thick pressed open section steel in a single piece, and designed to give a sufficient strength against stacking and racking forces.

4.11.3 *Top end rail*

The top end rail is constructed with 60x60x3.0mm thick square hollow section steel at lower part and 3.0mm thick pressed steel at upper part.

4.11.4 *Front wall*

The trapezium section front wall is constructed with 2.0mm thick vertically corrugated steel panels, butt welded together to form one panel, and continuously welded to front end rails and corner posts. All overlapped joints of inside are caulked with chloroprene sealant.

4.12 *Special feature*

4.12.1 *Customs seal provisions*

Customs seal and padlock provisions are made on each locking handle retainer to cover the sealed area in accordance with TIR requirements.

4.12.2 *Lashing fittings*

Ten (10) lashing hoop rings are welded to each top and bottom side rail at recessed corrugations of side panels but not extruded any cargo space (total 40 rings). Each lashing point is designed to provide a "1,500 kgs pull load in any direction" without any permanent deformation of lashing ring and surrounding area.

Three (3) lashing rods are welded to each corner post at the position of 150mm higher from the floor and 200 mm lower from the bottom surface of top corner fittings and in the middle between these two rods. Each lashing rod on the corner post is designed to provide a "1,000 kgs pull load in any direction" without any permanent deformation.

4.12.3 *Shoring slot*

A shoring slot, having a size of 60mm width x 40mm depth is provided on each rear corner post so that 2 1/4" thick battens can be arranged to be able to prevent doors from damage due to shifting cargo.

4.12.4 *Ventilator*

Each container will have ten small plastic ventilators of labyrinth type.
Each ventilator is fixed to each side wall by three 5.0mm dia. steel Huck bolts in accordance with TIR requirements after drying of top coating, and caulked with sealant around the entire periphery except bottom to prevent the leakage of water.

4.12.5 lock box

Each unit will have onne lock box welded on the door end.

5. *Surface preservation*

5.1 *Surface preparation*

1) All steel surfaces - prior to forming or after - will be fully abrasive shot blasted conforming to Swedish Standard SA*21/2* with near white metal surface, and anchor profiles of 25 to 30 microns to remove all rust, dirt, mill scale and all other foreign materials.
2) All door hardware will be hot-dipping zinc galvanized with approximately 75 microns thickness.
3) All fasteners such as self-tapping screws, hinges, cam keepers and lashing fittings will be electro-galvanized with approximately 13 microns thickness.

5.2 *Primer coating*

5.2.1 *Prior to assembly*

All steel surfaces will be coated with 20 microns thick two-pack polyamide cured zinc rich epoxy primer immediately after shot blasting, and then dried up in drying room.

5.2.2 *After assembly*

1) All weldments will be shot blasted to remove all welding fluxes, spatters, burnt primer coatings caused by welding heat, and other foreign materials.
   Then all blasted weldments will be coated with zinc rich epoxy primer.
2) Exterior of assembled container will be coated again 30 microns with zinc rich primer and again 40 microns epoxy primer prior to top coating.
3) Interior and base of assembled container will be coated again 30 microns with zinc rich primer.

5.3 *Top coating*

1) After drying of primer, exterior of container will be coated again with high build acrylic paint and interior will be coated again with polyamide cured epoxy resin based high build coating.
2) The dry film thickness of top coating will be 40 microns for the exterior and 40 microns for the interior.

5.4 *Under coating*

After completion of flooring, all the understructures and floor will be coated with minimum 190 microns dry film thickness underseal coating.

5.5 *The total dry film will be **(Microns)**:*

	EXT.	**INT.**	**BASE**
Zinc rich primer	30	30	30
Epoxy primer	40		
Epoxy high build coating		40	
Acrylic coating	40		
Underseal			190
Total (Min.)	110	70	220

6. *Marking*

6.1 *Arrangement*

The container will be marked in accordance with ISO, UIC, TCT, CSC and TIR requirements, owner's marking specifications and other required regulations.

6.2 *Materials*

1) Decal: Self-adhesive, high tensile PVC film for seven (7) years guarantee without peeling off, tenting or color fading.

2) Certification plate: Stainless steel plates to be chemically etched by acid.

6.3 *Specifications*

1) Identification plates such as consolidated data plate consisting of CSC, TIR and TCT will be riveted on the door permanently by stainless steel rivets. The entire periphery except underside will be caulked with sealant.

2) The owner's serial numbers and manufacturer's serial numbers will be stamped into the top plane of rear lower corner fitting.

7. *Testing and Inspections*

7.1 *Testing*

7.1.1 *Prototype testing*

The prototype container to be manufactured in accordance with this specification will be tested by manufacturer under the supervision of classification society.

	Test items & loads	**Test methods**
A)	Stacking Internal load : 1.8R-T Test load: 97,200kg/post 54,860kg/post(one door-off operation)	Hydraulic cylinder load will be applied to each corner post through top corner fittings. Offset: 25.4 mm lateral 38.0 mm longitudinal
B)	Lifting (from top corner fittings) Internal load : 2R-T	Lifting vertically. Time duration : 5 minutes
C)	Lifting (from bottom corner fittings) Internal load : 2R-T	Lifting 30 degree to the horizontal. Time duration : 5 minutes
D)	Restraint (longitudinal) Internal load : R-T Test load : 2R	Hydraulic cylinder load will be applied to the bottom side rails.
E)	Floor strength Test load : 7,260 kgs (16,000 lbs)	Use of a special truck. Total contact area: 284 sq. cm Wheel width : 180 mm Wheel centre : 760 mm
F)	Wall strength (front) Test load : 0.4(R-T)=0.4P	Compressed air bag will be used.
G)	Wall strength (side) Test load : 0.6(R-T)=0.6P	Compressed air bag will be used on one side only.
H)	Wall strength (door) Test load : 0.4(R-T)=0.4P 0.2P=5,400kg(one door-off operation)	Same as front wall strength test.
I)	Roof strength (weakest part) Test load : 300 kgs	Applied area will be 600x300mm longitudinal and transverse.
J)	Racking (transverse) Test load : 15,240kgs 7,620kg(one door-off operation)	Hydraulic cylinder load will be applied to the header rail through top corner fittings.
K)	Racking (longitudinal) Test load : 7,620 kgs	Hydraulic cylinder load will be applied to the top side rail through top corner fitting on one side only. Two times for pulling and pushing.

L)	Operation of door	After completion of test, the operation of doors, locks, hinges, etc. will be checked.
M)	Dimensions and weight	After completion of test, the dimensions and weight will be checked.
N)	Weatherproofness	Inside dia. of nozzle : 12.5mm Distance : 1.5 m Speed : 100 mm/sec. Pressure : 1 kg/sq. cm

* Note: **R** Maximum Gross Weight
T Tare Weight
P Maximum Payload

8. Guarantee

8.1 Structure

All the containers shall be guaranteed by manufacturer to be free from defects in materials, workmanship and structure for a period of one (1) year, from the date of acceptance of the container by the buyer.

8.2 Painting

8.2.1 The paint system coated on the container surface shall be guaranteed to be free from corrosion and failure for a period of three (3) years, from the date of acceptance of the container by the buyer.

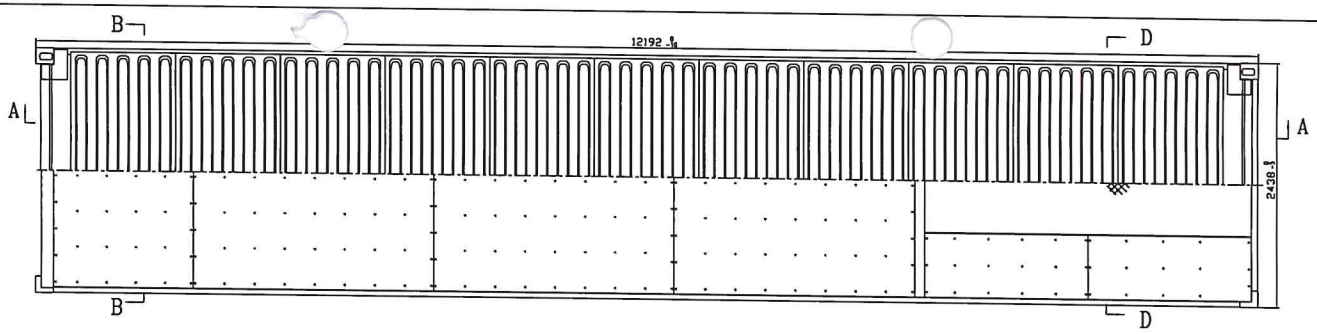
8.2.2 Corrosion is defined as rusting which exceeds RE3 (European Scale of degree of Rusting) on at least ten (10) percent of the total container surface, excluding that resulting from impact or abrasion damage, contact with solvents or corrosive chemicals and abnormal use.

8.2.3 If the corrosion exceeds RE3 as defined above within the guarantee period, inspection of the corrosion shall be carried out by the buyer, and paint manufacturer to detect the cause. As the result of the inspection, if it is mutually agreed and accepted that the corrosion has caused for the defective paint quality and/or poor workmanship, and/or paint manufacturer shall correct the defect on their accounts.

8.3 Decals

Decals applied on the container shall be guaranteed for a period of seven (7) years without peeling off, tenting or colour fading if decals are supplied by shall not be liable for any consequential damage or expenses occasioned by any defects for whatsoever reason or any loss of time due to repair or correction.

PART NAME		MATERIAL	REMARK
FRAME	SIDE RAIL	SPA-H	
	END RAIL	SPA-H	
	CORNER POST	SM50A/SPA-H	
	CROSS MEMBER	SPA-H	
PANEL	DOOR	SPA-H	
	ROOF	SPA-H	
	SIDE	SPA-H	
	FRONT	SPA-H	
WOODEN FLOOR		BAMBOO	



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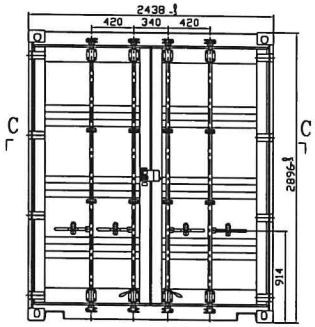

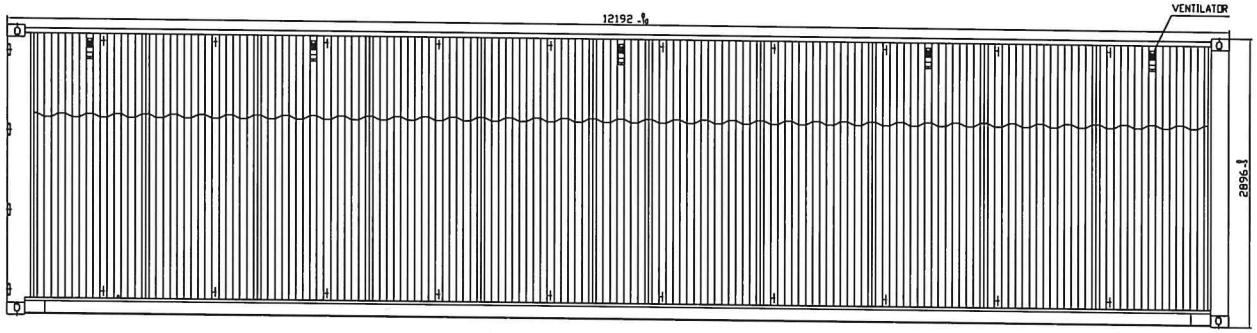

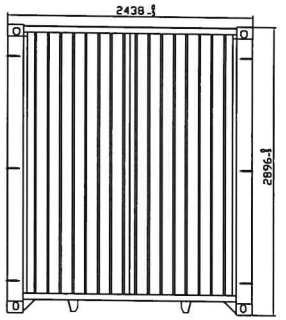

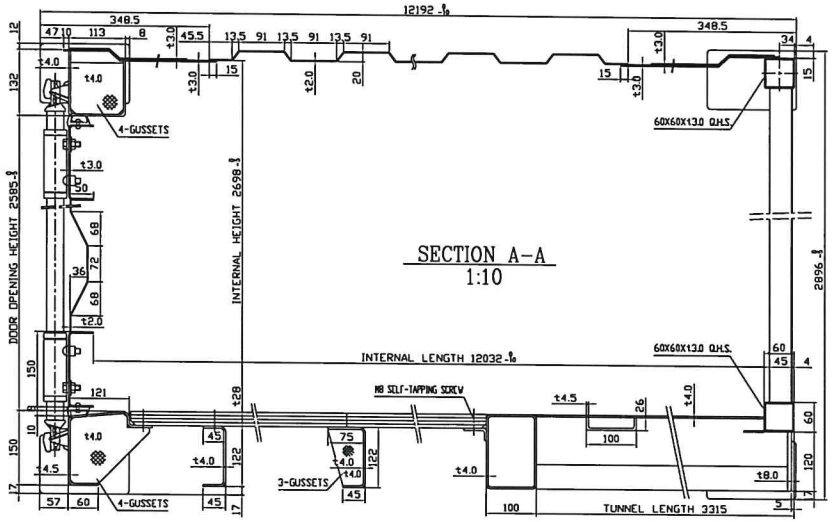

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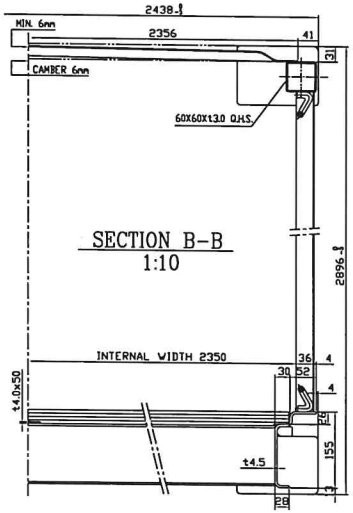

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CLASSIFICATION		DIMENSION			
EXTERNAL	LENGTH	12,192	+0 −10mm	40' 0"	+0 −3/8"
	WIDTH	2,438	+0 −5mm	8' 0"	+0 −3/16"
	HEIGHT	2,896	+0 −5mm	9' 6"	+0 −3/16"
INTERNAL	LENGTH	12,032	mm	39' 5 45/64"	
	WIDTH	2,350	mm	7' 8 33/64"	
	HEIGHT	2,698	mm	8'10 7/32"	
DOOR OPENING	WIDTH	2,340	mm	7' 8 1/64"	
	HEIGHT	2,585	mm	8' 5 49/64"	
INTERNAL CUBIC CAPACITY		76.3	CU.m	2,694	CU.ft
MAXIMUM GROSS WEIGHT		30,480	kg	67,200	lb
TARE WEIGHT		3,480	kg	7,670	lb
MAXIMUM PAYLOAD		27,000	kg	59,530	lb
STACKING TEST LOAD(PER POST)		97,200	kg	214,290	lb
FLOOR STRENGTH LOAD		7,260	kg	16,000	lb

DRAWING NO.	DESCRIPTION	REMARK
-40DBX-100S	BASE ASSEMBLY	
-41GBX-200CA	DOOR ASSEMBLY	
-40DBX-300	ROOF ASSEMBLY	
-40AB-1A-400N	SIDE ASSEMBLY	R/H:1 L/H:1
-41GBX-500CA	FRONT ASSEMBLY	

MARK	Q'TY	REV. FILE NO.	SIGNATURE	DATE
DESIGNED		APPROVED		
CHECKED		DATE	2021.05.03	

TITLE: GENERAL ASSEMBLY 총 도

DRAWING NO.

OWNER

TYPE 1SO-1AAA 40'x8'x9'6"

W'T(KG) SCALE